SCIENCE-FICTION INVASION! (See Page 36)

ARTHUR C.CLARKE
Exclusive Interview: Paradise Found!

MAY 1978 #2

FUTURE

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Artist's conception of the Space Shuttle in its 1979-80 launch configuration (pg. 6)

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"Things To Come" • The Wet Aliens • "CE3K"
NORMAN SPINRAD: Tomorrow's Multi-Visual Home
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The Magazine of Science Adventure

FUTURE

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On The Cover: Starting next year, the Space Shuttle fleet will be flying regular orbital missions. During a launch, the shuttle's side rockets fire until exhausted and are then jettisoned—falling back to Earth at a pre-designated spot where they will be picked up, refitted and reused. When the main tank (on the shuttle's belly) is empty, it will either fall back to Earth and break up on re-entry, or be carried to orbit and used in space construction. The first "spaceport" is now under construction at Cape Canaveral to handle shuttle traffic. Until that time, all launches will be from Edwards Air Force Base in California.

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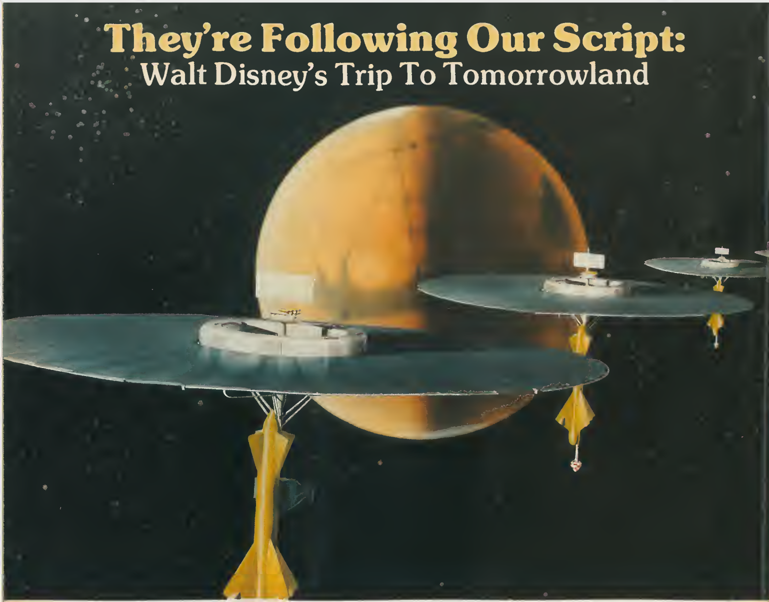
They're Following Our Script:
Walt Disney's Trip To Tomorrowland



Above: Dr. Stuhlinger's atomic powered Mars ships were 500 feet across and were to be assembled in space. Below: Von Braun's 4-stage rocketship being moved to the launching gantry and pad.

Photo: © 1955 Walt Disney Productions

By DAVID R. SMITH

On March 9, 1955 television audiences across the country tuned in to Walt Disney's *Disneyland* TV series were in for a shock. As the narrator finished his introduction and the familiar sight of Sleeping Beauty's castle faded from view, Disney fans found themselves gazing at something quite out of the ordinary. There, on the screen, was not Mickey Mouse, nor Donald Duck nor even Davy Crockett. Seated in his office was Walt Disney himself, holding a sleek model of a rocket. On that Wednesday evening, for the first time in the show's history, Walt Disney was preparing his audience for a trip into Tomorrowland with a startling vision of things to come!

"In our modern world," began Disney, "everywhere we look we see the influence science has upon our daily lives. Discoveries that were miracles a few short years ago are accepted as commonplace today. Many of the things that seem impossible now will become realities tomorrow. One of man's oldest dreams has been the desire for space travel—to travel to other worlds. Until recently, this seemed to be an impossibility, but great new discoveries have brought us to the threshold of a new frontier—the frontier of interplanetary space."

Keeping the rocket model in full view, Disney outlined what the viewers would soon be encountering. He promised to "give a factual picture of the latest plans for man's newest adventure," using both accepted facts and perceptive theories to give shape and substance to the great leap into space. That evening's first Tomorrowland presentation, "Man In Space," was to be the first of three "science factual" presentations that would take Disney fans into the

---

David R. Smith is Director of Archives at Walt Disney Productions, a post he has held since the inception of the archives in 1970.

mysteries of deep space during the next three years. The shows combined meticulously researched data with mind-boggling visuals and old fashioned animation slapstick, using the skills of the entire Disney staff—led by director Ward Kimball—and the minds of some of the greatest names of science in the 1950s. The three Tomorrowland presentations garnered worldwide acclaim and, perhaps, even played a part in furthering the American space program. But, in order to understand the making of the shows themselves, one really has to explore their origins in the years before Disney's spectacular series had even been conceived of as TV fare.

In the early 1950s, Walt Disney was beginning to formulate plans for an amusement park to be called Disneyland. This would be an amusement park like no other amusement park; in fact, that term was shunned because of the connotations of dirty, dingy midways and besides, a new term, "theme park," had been coined. Disneyland would indeed be built around a theme—Disney—and divided into four general areas or lands: Adventureland, Frontierland, Fantasyland, and Tomorrowland. In each of these four realms, the rides, shops, and food facilities would follow the theme of the land. Adventureland would feature a jungle cruise and shops selling exotic goods of Africa and the East. Frontierland would feature stagecoach and riverboat rides, a plantation house restaurant, and a show in the Golden Horseshoe saloon. Fantasyland would have attractions based on the immortal Disney animated film classics. And finally, Tomorrowland would feature a trip to the moon and exhibits of modern technology by some of America's leading corporations.

Walt Disney, in order to help finance his dream, took a step which horrified other movie producers but which he would never regret—he went into television. The rise of television in the early years of the decade had created a situation where Americans were finding entertainment in the comfort of their living rooms rather than going out to their local movie theaters. Box office receipts plummeted. Movie producers pointedly tried to ignore the new media: for years they would not allow any movies made after 1948 to be televised. Walt Disney, on the other hand, had premonitions about television. He realized that this was not just a temporary phenomenon but something that was here to stay. Rather than act like an ostrich with its head stuck in the sand, he would use television for his own purposes. He would use television to help advertise his motion pictures, and he would use television to get his Disneyland built. He made an agreement with the American Broadcasting Company stating that he would go onto their network with an hour long, weekly show if they would loan him some money to help build Disneyland.

The new show was called "Disneyland." When it first aired in October, 1954, its aim was not only to entertain but to promote the park that was under construction in Anaheim, California. Early plans were to eventually originate the show from Disneyland, and so the program was divided into the same four realms that would be found at the park. The tremendous Disney film library could be called upon to supply the shows from Adventureland and Fantasyland. For Frontierland, Disney decided to do three shows on the frontier hero, Davy Crockett, which turned out to be an excellent choice. But when it came to Tomorrowland, Disney was momentarily stumped. Tomorrow was the future. There had been no previous Disney work on future technology. Similar problems were encountered in trying to decide what to put into the Tomorrowland at Disneyland.

The person to whom Walt Disney turned for help was Ward Kimball. Kimball had been a member of the Disney staff since the mid-1930s and had distinguished himself as an animator in such films as *Snow White And The Seven Dwarfs, Pinocchio,* and *The Three Caballeros*. Some people have called Kimball the world's first hippie; at the very least he was a little ahead of his time in his dress and with his ideas. He remembers, "Walt came to me and said, 'You guys are the modern thinkers around here'—probably using the term in a snide way—'can you think of anything we can do on Tomorrowland?' And that's when I said I had been following some very interesting articles about space in *Collier's Magazine.* It was fascinating for me to realize that there were these reputable scientists who actually believed that we were going out in space."

The *Collier's* series of space-related articles were well-researched, and written by some of the most prominent space experts of the period. In the March 22, 1952, issue, Wernher von Braun wrote "Crossing the Last Frontier," Willy Ley wrote "A Station in Space," and Heinz Haber wrote "Can We Survive in Space?" Von Braun continued with articles later that year on flights to the moon, while Ley described the insides of the space ships and space stations. The series continued in 1953 with an article about a space station and in 1954 with "Can We Get to Mars?" Many of the illustrations of von Braun's rockets and Ley's space stations were drawn by the noted illustrator, Chesley Bonestell.

Kimball and his layout man, Ken O'Connor were the first to start on the project. They read and reread the *Collier's* articles and then for advice approached Charles Shows, who was doing a live space program at television station KTLA in Los Angeles. Shows began work on some early treatments, but he had difficulty mastering the Disney storyboard approach. And so, Disney sketch artist and writer, Bill Bosche, was added to the crew. Shows, Bosche, and Kimball presented their outline to Walt Disney in a conference on April 17, 1954, and a transcript was made of that meeting, and many later ones as well. Some of the comments reveal the dedication of the Disney staff in trying to come up with a definitive program:

Walt Disney: There are two sides to go on this—comedy interest and factual interest. Both of them are vital to keep the show from becoming dry. You need a good balance to keep it from becoming too dry and corny. We don't want to compete with Sid Caesar or do that type of thing. We want to do something new on our show. . . .

We are trying to show man's dreams of the future and what he has learned from the past. The history might be a good way to work in a lot of your laughs. People laugh at inventions of the past such as the guy trying to fly with feathers, because with the inventions and the progress of science today, people feel superior. Man is always trying to invent something so that he doesn't have to work so hard. He is the human animal. I think that is your basis. He is constantly trying to simplify things. . . .

Ward Kimball: The kids really accept this stuff on space. They really believe it. . . . To make this information interesting to the whole family, you have to have the comedy touch in there for the younger kids. The facts are fascinating but if you lighten it up with cartoons or something, it would make a complete family deal. . . .

Photo: © 1957 Walt Disney Productions

> **Walt Disney**: We could show that man has been constantly seeking a way to get up into the air. We should show what he might find when he did get there. He has wanted to fly all through history. Now he wants to get out on Mars to see what all these people look like. . . .
>
> **Ward Kimball**: We could go into a little cartoon thing on Mars and its inhabitants. It would be a great little cartoon.
>
> **Walt Disney**: We should be careful and keep our serious stuff separate. We have to watch it so the material doesn't get corny . . . . I think this parallels the True Life Adventures—facts, and opening up this world to the people.

Throughout the meeting, Disney stressed man's curiosity. He saw real possibilities in this space show, and it was given a working title of "Rockets and Space." Already he was planning his moon-ride attraction for Disneyland, and in the meeting he gave his first description of it: "We want to build this thing in the park. In the space ship you have a viewing room above and below. When we take off we want to give the effect of really taking off. You get the noise, the sound effects, and you see the gases there. Pretty soon you see the earth pulling away. We really want the people to get the feeling of a trip to the moon."

After the meeting an event occurred that old-time Disney hands cannot remember happening before or since. Bill Bosche recalls, "I remember when we finished the meeting, Walt was enthusiastic about it. He walked out of the story room, stopped at the desk, and ripped off a blank sheet of notepaper. He handed it to Kimball and said, 'Write your own ticket.' I remember Harry Tytle was standing there when Walt said that and his eyes just about dropped out of his head. Walt *never* said anything like that."

Ward Kimball realized that any work on a space project was going to be expensive, so he was delighted with the blank check which he received from Walt Disney. The key to his whole plan was the need to bring in prominent scientific advisors. Not all space experts in the U.S., however, were willing to help. Some had become discouraged after years of trying to get the country to begin a space program. One such person said to a Disney staff member in a letter, "I am a retired old scientist having found through thirty years of strenuous research the stuff that most people of our days can very well get along without. I say this with the knowledge that insofar as today's scientists are concerned, the fruits of my labor could very well lay dormant for another century. However it is possible that I may be wrong. I must say that your firm seems always to have been foremost in expounding new views and perhaps in this case Mr. Walt Disney will outdistance our ordinary scientists and, possibly, shorten the aforementioned century."

Where better to search for qualified experts than in the pages of the *Collier's* articles? The first to be contacted was Willy Ley, a German originally trained as a zoologist but who had come to the United States before World War II and had become a top space historian and writer. Within two weeks after that initial April meeting, Ley arrived at the Disney Studio and began a series of meetings with Kimball and Bosche and key members of their staff such as Julius Svendsen, John Dunn, Art Stevens, Ken O'Connor, and Jacques Rupp.

The men were fascinated with Willy Ley. Despite the odorous cigars that he chain-smoked, they gathered around him and hoped that some of his knowledge would rub off on them. According to Bosche, "Willy was a real encyclopedia. He had information on just about anything you wanted. If you asked him a question, he'd pause for a second, then he'd say in his music hall German accent, 'Vell, as a matter of fact,' and then he'd take off with an encyclopedic description of whatever it was you were asking him. He was a very amusing fellow; we all got a big kick out of him." Ley regaled the Disney men for hours on end with information about all aspects of space travel. He insisted that the planned flights could be done immediately, that no additional discoveries were needed, just money and motivation. Future discoveries would only make it easier.

After several days of sessions with Ley, the Kimball unit put together a new storyboard presentation for Walt Disney. In that meeting on May 14, an idea surfaced: the single "Rockets and Space" show could easily be divided into two shows. Disney recommended, "In effect it's like making one feature, but you are dividing it into two parts for TV. Build that space ship, put it together up there and then it's a cliffhanger. They will be waiting for this next one. On the next one show what the space station does and go to Mars." He had the idea that the two parts could then be assembled as a theatrical feature for the foreign market, where the real money was. It was only after several more months of meetings that it became obvious that they had enough material for three shows, not two.

Walt Disney was very busy, with the construction of Disneyland almost ready to begin and was unable to provide his usual advice and counsel to the Kimball unit during the production of the space shows. Nevertheless, he attended the May 14 meeting and delivered a philosophical underpinning which was to guide the unit during the upcoming months.

> We are known for fantasy, but with these same tools that we use here we apply it to the facts and give a presentation. I think that's very important for this series—a science factual presentation. The only part I would play would be the moderator—introduce and let it

The interior of the command stage of the Moon rocket designed by Werner von Braun. Frank Gerstle played the captain in 1955.

Photo: © 1955 Walt Disney Productions

> go. That's the key for this whole series. I actually would be asking the questions for the audience. I think there is something exciting to the audience if we set it up and the group is made up of part of the staff here and the experts. Men dealing with fantasy and men dealing with fact coming together, meeting and combining their resources to present this material.

The format of the first show was becoming apparent: begin with a little history of rockets, then a section on space medicine, followed by the building of a space ship. Disney suggested for the space medicine section a little human cartoon character to act as a guinea pig. "We can have this little character right off the drawing board. He could be listening in on the discussion. He's worried because he's the one that's going out into space. So he immediately has life. He becomes the guinea pig. He's the little guy that comes in on all the experiments. As we go from one thing to another he's always there. Every time we have a homo sapien there, he's the fellow."

Two more scientific experts were desired for the first show: Wernher von Braun, so they could use his design for a four-stage spaceship, and Heinz Haber, space medicine expert. Von Braun, formerly head of the German V-2 rocket installation at Peenemunde during World War II, had come to the U.S. at the end of the war, along with many colleagues, to continue his research on rockets and space travel. At the time, he was chief of the Army's Guided Missile Development Division at Redstone Arsenal, Huntsville, Alabama. Haber had spent five years as research scientist at the U.S. Air Force School of Aviation at UCLA. Ley signed a contract in May, 1951, calling for him to receive a weekly salary. Haber and von Braun signed contracts in July, but they were paid consultants' fees rather than salary. Haber eventually took a year's leave from his university post to assist Disney on several science-factual presentations, one of the most widely acclaimed being "Our Friend the Atom."

Story work continued during the summer of 1954. Before von Braun came on the scene, Willy Ley, a friend of his for many years, wrote him to explain what he would be doing on the show, and reported, "For the live action sequences, three models will be built—one, a V-2 rocket, one a 3-stage instrument carrier, and your 4-stage ship—all to the same scale and in proper proportion to each other. Possibly we will also build a model of the space station. This still remains to be decided. It is simply a question of whether it takes less time to build the model or draw it. The space station will be just as designed for *Collier's*. For the 4-stage ship a small change seemed indicated. All the artists felt that a Delta wing looked more modern. I saw to it that the total area of the Delta wing is within 50 square feet—the same area as your swept back wings . . . The technique of drawing the scenes will be such that the audience will always know that this is a drawing, even though it moves. We do not try to make it appear like the actual event. It is not a George Pal production, but a Disney production."

Disney craftsman Wathel Rogers was put to work building the scale models, and it was decided to also include a model of the space station. (This latter model is presently on exhibit in the Smithsonian's National Air and Space Museum in Washington.) Harry Tytle was given the job of trying to procure film footage of rockets for the history section. Early on he discovered that it would be easy to secure German rocket footage—from German film archives and from footage captured by the U.S. during and after the war—but vintage film footage on American accomplishments, such as those of Robert H. Goddard, was almost nonexistent.

Wernher von Braun was a very busy man, but he managed to work in several visits to the Disney Studio during trips to the Los Angeles area. Often he was involved in meetings at Douglas until 5 or 6 p.m., after which he went to the Disney Studio and worked with Kimball and his unit until well into the early morning hours. He became very closely involved in the story, and he made many suggestions, some of which went into great detail. For example, in a July meeting, he explained about fueling the rocket:

> There is no need for any fueling trucks around the ship, because fuel storage must be in underground tanks. These tanks are adequate for the fueling of one ship, and are replenished through a pipe from the tankfarm which should be several miles away. The underground fuel tanks at the launching site are connected with a fueling panel in a pit near the launching site. This panel is serviced by an operator who opens the hatch and enters the pit. There are several pipelines connected to the arm of the gantry structure through which the hydrazine and nitric acid are pumped through the fuel lines to the various stages. All three stages and the returnable tank for the winged upper stage are filled separately. The fueling pipe for the top stage should be 1" in diameter, for the 3rd stage 2", and for the 2nd stage 8", and for the 1st stage 32".

Mars expert, Dr. E.C. Slipher of the Lowell Observatory, joined the Disney production to advise "Mars and Beyond."

Photo: © 1957 Walt Disney Productions

Ward Kimball considered von Braun a genius. Here was a man who was devoting his life to space flight. He had carefully spelled out his ideas in the *Collier's* articles, but no one seemed to be paying attention. The Pentagon certainly didn't believe in the ideas. So, when Disney called him to do the space shows for TV, he pounced on the opportunity. He realized the power of TV, with millions of people watching. You just don't get those numbers reading *Collier's*. Von Braun was a salesman and a showman; in fact, he has been called the Walt Disney of the space field. He knew that you needed humor and entertainment in your story. In discussing the period when the manned rocket arrives in orbit, he mentioned:

> We can add a couple of humorous notes here. For example, there can be radio communications between the general and the ship—he may ask questions and instead of a reply all he gets is this terrific roar—or later on, after the motor cut-off, instead of an answer from the crew he will hear these silly remarks the crew makes about weightlessness. One might say: 'Get your feet out of my face.' I was thinking that what comes out of this giant loudspeaker on the ground could be irrelevant at times.

Von Braun and the Kimball unit carried on an extensive correspondence between meetings, with Bill Bosche sending long lists of technical questions and receiving detailed replies. One letter contained a P.S. by Ward Kimball, who humorously chided, "It'll never get off the ground." Von Braun answered with his own P.S., "So you say it will never take off the ground! All I can say is 'hah-hah!' Wait and see."

It was decided to use the three experts—von Braun, Ley, and Haber—in the film to add authenticity, even though all had German accents and there was some discussion as to whether that might be a drawback. "Man in Space" became the title of the first show

Werner von Braun, Willy Ley, Walt Disney, and Heinz Haber were the designers of tomorrow who stirred America's interest in the exploration of outer space.

Photo: © 1955 Walt Disney Productions

when the decision was made to divide the material into three shows. The first would discuss history, space medicine, and the launching of the four-stage rocket; the second, the building of the space station and a trip around the moon; and the third, a trip to Mars.

"Man in Space" totalled 48 minutes, exclusive of commercials. After Walt Disney's introduction, Ward Kimball acts as the narrator and is himself shown on camera. The show begins with a history of rockets, from the world's first, used during the battle of Kai-fung-fu in China in 1232 A.D., to the Wac-Corporal "Project Bumper," a two-stage rocket in 1949 that went up 250 miles to touch the realm of outer space. Willy Ley then comes on to say that a three-stage rocket is the next logical step. The third stage would go into orbit and send back the information needed in order to send a man into space. In introducing Haber, Kimball says, "One of the big question marks of future space travel will be man himself. How he will react mentally and physically to this unearthly experience is the concern of a new field of science called 'Space Medicine.' " The guinea pig character, called "homo sapiens extra-terrestrialis" or "space man," makes his appearance in the cartoon segment. Haber warns of some of the possible consequences of weightlessness and meteors striking the spaceship. He continues:

> On earth, we are not exposed to dangers from space owing to the protective layer of our atmosphere. But up there, even the hull of the ship will not shield man against the possible hazards of the mysterious cosmic rays. These tiny bullets from the infinity of space will continually penetrate everything. They may prove to be harmful to man. The most energetic of these atomic rays may feel like stings as they shoot through the body.

Wernher von Braun then comes on to describe his four-stage orbital rocket ship. He prefaced his remarks by saying, "If we were to start today on an organized and well-supported space program, I believe a practical passenger rocket can be built and tested within ten years." His description of the winged fourth stage brings to mind the current design and testing of the Space Shuttle, but pre-dates our ideas by 22 years: "First we would design and build the fourth stage, and then tow it into the air to test it as a glider. This would also allow the crews to practice. Next, low-altitude flights would be made firing the small rocket motor." Von Braun's rocket ship was designed to carry 10 crew members in the top section, which would have its own small rocket motor,

Its descent slowed by a drag chute, a lander craft nears the Martian surface.

Photo: © 1954 Walt Disney Productions

Gathered in front of the storyboards for "Man In Space" are Charles Shows, Ward Kimball, Ruby Barbera, Willy Ley, Julius Svendsen and Bill Bosche.

wings, and landing gear. The rest of the rocket comprised:

1st stage—1,060 tons of fuel with 29 motors, to lift the entire weight of the ship vertically off the ground.

2nd stage—155 tons of fuel with 8 motors, to be dropped when the speed has reached 14,300 mph.

3rd stage—13 tons of fuel with 1 rocket motor, to give the passenger section the final kick to attain orbit, and to remain attached until just before the return flight.

It was envisioned that the first launching would take place on a small atoll of coral islands in the Pacific, "where man is dedicated to just one cause—the conquest of space." The show ends with a dramatization of what man's first flight in space might be like, laying the groundwork for the future construction of a space station, the exploration of the moon, and eventually a reach to the planets and the infinite universe beyond.

"Man in Space" was well-received by the TV audience. In simplifying for the layman some highly technical steps involved in sending a man into space, it succeeded in awakening an interest in space among Americans, as von Braun had hoped it would. Scholer Bangs wrote in the *Los Angeles Herald & Express:*

> Walt Disney may be America's "Secret Weapon" for the conquest of space! Apparently and quite by accident, he has discovered the "trigger" that may blast loose his country's financial resources and place the Stars and Stripes of the United States aboard the first inhabited earth satellite. Disney's immediate achievement, with the aid of this triumvirate of space authorities, is the suggestion that space travel no longer is a wild dream; that it is so near that we can practically feel the earth tremble under the rocket blast of Dr. von Braun's spaceship. "Man in Space" is believable and Disney has close to 100,000,000 Americans believing. Half of the voting population of the USA has probably reached two impressive conclusions: "It CAN be done!" and "Let's get on with it!"

One particularly important person viewed "Man in Space"—President Dwight D. Eisenhower. Ward Kimball recalls, "When 'Man in Space' was finished, Eisenhower borrowed the show to run for the brass in the Pentagon. He called Walt personally to borrow 'Man in Space' and they ran it for a couple of weeks. It was like an educational space primer." The show aired on March 9, and had a rerun on June 15; on July 30, the President made the momentous announcement that the government had approved plans for launching earth-circling satellites as part of the U.S. participation in the International Geophysical Year. A third airing of "Man in Space" was hurriedly scheduled for September 7 because of the interest created by Eisenhower's announcement.

Photo: © 1957 Walt Disney Productions

After hearing that President Eisenhower had borrowed the film, Disney publicists figured out they could get a little mileage out of the event. That prompted an exchange of correspondence between Kimball and von Braun:

Kimball to von Braun, Aug. 24, 1955:

"The Studio intends to ballyhoo the first 'Man in Space' show when it's rerun for the third time on September 7 as the one item that contributed the most to Eisenhower making the space satellite announcement. After he sees the Moon picture he'll probably come out and make a few more announcements (we hope)."

von Braun to Kimball, Aug. 30, 1955:

"I am quite upset about your statement. I am sure that a statement to the effect that this show contributed the most to President Eisenhower making the satellite announcement is bound to antagonize quite a few people who had a hand in putting the project across. They will feel that I myself through the vehicle of the Disney Studio am trying to get credit for more than I deserve and this would hurt my pleasant relations with many of the people I have in mind. I would appreciate it if you would take this matter up with Walt and try to have the pitch changed. There would be absolutely nothing wrong with playing up the point that the President's announcement showed that all these space matters are given very serious attention today and that some of these things may be closer to reality than many people believe. But for God's sake don't put it that this show triggered the presidential announcement. The preparatory work that finally led up to this announcement has been going on a long time and these people would not like such a statement at all. As a result the statement would hurt the cause far more than it would help.

Kimball to von Braun, Sept. 1, 1955:

"I am sorry you became so alarmed over my statement that we were going to exploit the fact that Eisenhower was inspired to make the space satellite announcement as a result of our picture. Please file my remarks under the heading of 'Colorful Expressions'."

Did the show really help trigger Eisenhower's announcement? With the principals no longer around, we may never know.

Man and the Moon

The story for the second show on space was formulated at the same time as that for the first show. Ward Kimball decided to preface the trip to the moon with a little history of the moon. This would be the humorous, animated part of the show, with legends, superstitions, and songs about the moon. An accurate scale model of the moon was built at the Disney Studio and approved by Roger Hayward, who had created a similar one for the Adler Planetarium in Chicago.

For the moon trip, the Kimball unit decided to use live action instead of animation to lend greater believability. The inside of a spaceship was constructed on a Studio sound stage and four actors were hired to portray the captain, navigator, engineer, and radioman. To make the set as authentic as possible, two Boeing 377 pilot's chairs were borrowed, along with two model 618M aircraft seats from Douglas. Prototype space helmets were borrowed also, and Ken O'Connor and Bill Bosche, along with von Braun, invented a space suit.

Von Braun again provided the narration. Kimball wrote him, "The Studio has purchased a new teleprompter which I think you will find a lot easier to use in helping you remember the lines. This shooting will be a little more complicated than the last picture, and anything you can do to memorize lines will help out in the confusion."

Von Braun followed the moon lore section by introducing the concept of the moon flight:

> The voyage around the moon must be made in two phases. A rocketship taking off from the earth's surface will use almost all the fuel it can carry to attain a speed great enough to balance the pull of gravity. Unpowered, it will then keep circling the earth in an orbit outside of the atmosphere. This is the first phase. However if we refuel the ship in orbit with fuel brought up by cargo rocket ships, it can set out on the second phase, the trip around the moon and back.

The space station, established as an advance base 1,075 miles above the Earth, would be in the shape of a wheel 200 feet across. The outside rim would contain living and working quarters for a crew of 50 men. An atomic reactor would drive a turbo-generator to supply the station with electricity. Access to the station would be by an air lock in the hub. The wheel would rotate at three revolutions per minute, with the resulting centrifugal force producing an artificial gravity for the men in the rim. The space station would make a complete trip around the Earth every two hours, with no apparent motion to the crew, but hurtling around the earth at 16,000 miles per hour.

For assembling the structure and handling repairs, von Braun invented a special space suit, nicknamed a bottle suit because of its shape. The bottle suit used gyros and two small rocket motors so the operator could tilt and move in any direction. There would be seven remotely-controlled mechanical arms, each a specialized tool—hook, wrench, screwdriver, etc.

The moon trip depicted on the show was used to test methods and equipment to be used on later voyages into deep space. It was essentially a scouting trip, with no landing attempted. The 53-foot moon rocket carried a crew of four men. A little suspense was added to the trip as a small meteor pierced a nitric acid tank, necessitating a repair in space using the bottle suit. On the dark side of the moon, the ship fired flares in order to perform their photography. Despite the Disney visualization, von Braun reported, "Even though we now have the theoretical knowledge necessary to make a trip to the moon, it will be many years before our plans can fully materialize."

Walt Disney had the first showing of the moon picture for the American Rocket Society at the Studio in conjunction with their convention in Los Angeles. The large model of the moon was set up and dramatically lighted in front of the theater. The show was well-received by the rocket experts and later by the public when it was shown on TV. One complaint that appeared in a number of letters concerned the whooshing noise made by the flare rockets on the dark side of the Moon, as there is no sound in space. Kimball today defends the film on this point:

> Look at *Star Wars* and those "ching, ching, ching, ching" sounds. What would you have if you didn't have sound in *Star Wars* ! You have to do that. That is the license you have to take. Von Braun always went along with it. Willy Ley would say, "You vud not hear the sound of it." And that's the difference between von Braun and Ley. That's why von Braun sold the space program. He had imagination. Willy was a repeater of Newtonian facts. They all had to be proven. Heinz Haber was the same way. Everything he did was based on known discoveries and proven facts, extended here and there. Von Braun had an imagination, you can go through history; the people who went beyond those that said, "no you can't do that" were the ones who made the discoveries.

Photo: © 1955 Walt Disney Productions

Photo: © 1967 Walt Disney Productions

Left: The TWA Rocket to the Moon was the center of Tomorrowland in 1955. Below: The entrance to Tomorrowland after its redesign in 1967 by Disneyland "imagineers."

Mars and Beyond

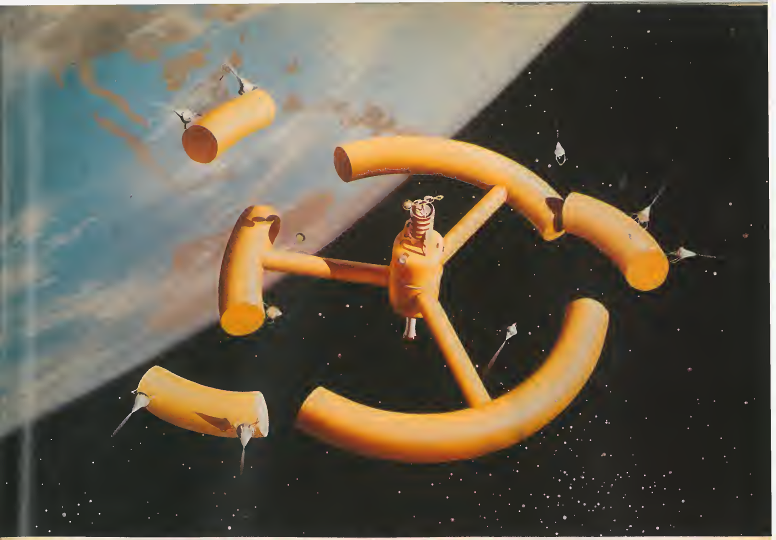
Plans for the third space film began taking shape in 1954, and Kimball was aiming for a Spring, 1956, airdate when Mars was closest to earth, but the show did not air until 1957, for a variety of reasons. After the airing of the first two shows, the American space program proceeded with Project Vanguard, spearheaded by the National Academy of Sciences and the Navy, rather than von Braun's Redstone project, which had planned for putting aloft our first satellite. Public opinion was still skeptical. Alton L. Blakeslee in the *Los Angeles Times* in January, 1956, predicted that the first firing would come in the latter half of 1957. But he cautioned, "Don't be swept away by over-enthusiasm or arm-chair speculation. Successful launching of the little satellites alone will be a tremendously complicated task. It will be a first experimental step, as the first Wright Brothers' flight was only a starting point in the knowledge that now makes jet planes possible. Manned space flight is a chapter for some indefinite future." Jack Anderson and Fred Blumenthal in *Parade* predicted a tiny satellite for 1958, but went on to say we would launch a man-carrying satellite in 1980 and circle the moon in 1988. A landing on the moon was represented by only a question mark.

The National Academy of Sciences and IBM asked Disney to make a film on Project Vanguard, so the Kimball unit was assigned the project and "Mars and Beyond" was temporarily placed on the back burner. They prepared a story and the Studio was all ready to go into production when an event occurred that shook the world.

On October 4, 1957, Russia orbited Sputnik I, the first artificial satellite, marking the dawn of the space age and jolting the United States with shock waves that were felt throughout our political and educational institutions. The immediate result at the Disney Studio was the cancelling of the Project Vanguard film.

Just a month after Sputnik I, the Rus-

Art: © 1955 Walt Disney Productions



The von Braun designed "bottle suits" assembled Space Station 1 on Disney's "Man and the Moon" broadcast in 1955.

sians launched Sputnik II, this time with a dog as a passenger. After Sputnik II, von Braun and his group of former German rocket scientists were instructed to prepare for the launching of an artificial satellite. Von Braun promised on November 8, 1957, to put a satellite into orbit within 90 days.

"Mars and Beyond" aired on December 4, 1957. Two days later, the hopes of Americans were temporarily dashed when the Navy project's Vanguard rocket blew up on its launch pad. It was up to von Braun's group to uphold American honor by launching Explorer I on January 31, 1958, the first American satellite. It was followed by the finally-successful Vanguard I on March 17, 1958.

Disney was lucky that he had concluded the story meetings and filming sessions with Wernher von Braun before Sputnik, because after October, the scientist became too busy for such frivolities as entertainment TV shows.

Most of the story meetings had been held two years before. Willy Ley had designed an atomic, dumbbell-shaped spaceship for a Mars voyage; von Braun disagreed:

> So far, we have tried to be as factual as possible, but this third picture is Fantasyland. What I am saying is this: Willy never pretended to know what a Mars ship would look like; he based his ship on the fundamental idea of a powerful reactor. But the fuel for such a ship would be a problem. Basically, atomic energy only provides heat. But these guys forget you have to convert that heat and thrust in a vacuum—and fundamentally, you can get heat into motion only by expelling something.

Von Braun suggested that Kimball bring in a colleague of his, Dr. Ernst Stuhlinger.

Dr. Stuhlinger was a nuclear physicist, who had in 1953 written a paper on "The Possibilities of Electric Space Ship Propulsion." He travelled to the Disney Studio and helped the Disney artists design the spaceships for the Mars flight. Writing to Ken O'Connor, he said, "Here is now the schedule for the trip to Mars and back. The total time for the expedition (3¼ years) does not seem unreasonable. I was quite satisfied to realize that the trip to Mars and back with an electrically-propelled space ship is so well within the limits of feasibility." Bill Bosche recalled that Stuhlinger was a very shy, retiring man, but absolutely brilliant. It was the feeling of the Disney artists that he sat in the back room with a calculator making von Braun's grand ideas work.

During the preparations for the show, Willy Ley, von Braun, and Kimball went to the home of Rex Bohannon, and it was there that von Braun saw Mars for the first time. According to Kimball:

> That was the closest that Mars had been in years. It was a beautiful night in La Crescenta, up in the hills, and we had this 6-inch refractor telescope. We had Mars and there were the polar caps and there were the little markings across the surface. For about five minutes out of the two hours, the resolution was beautiful; there were no disturbances. Von Braun was fascinated; he had never seen Mars this close before. He swore he could see canals. He just didn't say a word, and he was a pretty talkative guy. He was really impressed.

Kimball recalled the last "Mars and Beyond" story meeting with von Braun:

> He'd come in about 5 in the afternoon, and many's the time we'd work until 3 or 4 in the morning. Then I'd drive him back to his hotel. I remember the final night he spent with us, working with Stuhlinger on nailing down the atomic rocket hardware and how it would be presented. It was a tough night and we were sitting there in our shirtsleeves sweating. It was a long session. When he was through, he threw down his pencil and turned around to a piano and for ten minutes played Bach, wide open. I didn't even know he played the piano. He just rattled it off, flawless. He was a genius. He could do anything. Then he stopped, clapped his hands, and said, "Well, Wahd," (that's the way he pronounced my name), "how about taking us back to the hotel?"

For the humorous section of the show, Kimball decided to discuss the possibilities of life on other planets, considering even the crackpot ideas in order to take advantage of his unit's unique style of animation. In a story meeting he mentioned:

> We have quite a few new fellows coming in under the training program and to start a program of getting other people interested in what we are doing, we sent out a questionnaire asking them to draw up their conceptions of what a Martian would look like. From that it gave us an idea that we might have a section along with all the others on what life might be like on Mars—Disney version.

Ley was asked pointedly if he believed there was any life on Mars. He replied, "My personal belief which I cannot defend with any great amount of reasoning is—not anymore. I think there might have been at one time." Kimball's plans for the section were reinforced by a radio newscast on June 18, 1957 which reported that Air Force space medicine researchers had determined that some forms of basic life might be possible on Mars, "conditions seemingly fatal for most life forms on earth could be the habitation of creatures entirely unknown to man." The creatures that Kimball and his artists created certainly fit this category; there was no limit to their imagination.

The completed television program again opened with an introduction by Walt Disney:

> In this exciting age when everyone seems to be talking about the future possibilities of space travel, there is much speculation on what we will discover when we visit other worlds. Will we find planets with only a low form of vegetable life? Or will there be mechanical robots controlled by super-intelligent beings? One of the most fascinating fields of modern science deals with the possibility of life on other planets. This is our story.

Another scientific expert joined von Braun on this show—Dr. E.C. Slipher, senior astronomer and one of the world's foremost authorities on Mars, from the Lowell Observatory in Arizona.

The Mars flight visualized on the show featured an expedition of six of Dr. Stuhlinger's atomic-powered, umbrella-shaped spaceships. The ships, 500 feet across, were assembled in space and departed for Mars from the previously built space station. A small landing craft was carried for the final descent to the Martian surface from an orbit 620 miles above. The trip lasted 13 months and 6 days.

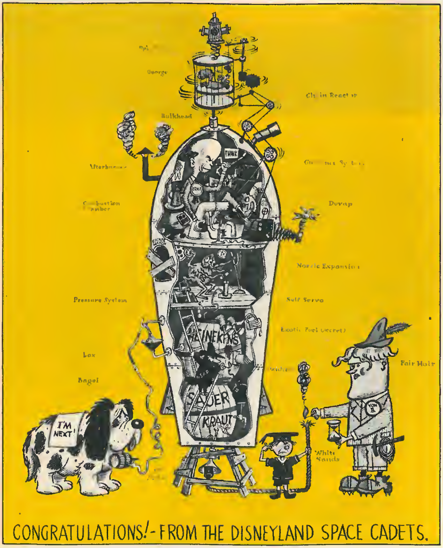
The show concluded on a philosophical note:

> When an earthman finally walks upon the sands of Mars, what will confront him in this mysterious new world? Will any of his conceptions of strange and exotic Martian life prove to be true? Will he find remains of a long dead civilization? Or will the more conservative opinions of present-day science be borne out with the discovery of a cold and barren planet where only a low form of vegetable life struggles to survive? These questions will be answered by our space pioneers of the future. In solving the enigma of the red planet Mars, man may find a key that opens the first small door to the universe.

As the narrator intoned these words, a flying saucer zipped across the screen. Willy Ley and Heinz Haber had from the beginning fought to leave out any mention of UFOs, arguing that this would immediately cause skepticism among the viewers, but Kimball saved it for the very end. This third show had been more science-fiction than science-factual, and necessarily so because so few facts about Mars were known at the time. If a glimpse of a flying saucer was to appear anywhere, this would be the appropriate place.

Because of its timeliness, coming at a moment, according to one reviewer, "when man's achievements in space are beginning to catch up with his thoughts and dreams," "Mars and Beyond" received special press screenings across the country prior to its airing. The reviews were excellent. The *Oakland Tribune* wrote, "Having previewed 'Mars and Beyond' this reviewer recommends it to any who have wondered or worried about the significance of Russia's Sputnik and Muttnik; it's an educational spectacular." Other favorable reviews followed: "a winner on any planet," *The Washington Evening Star*; "consistently interesting and informative, with enough light touches to make it amusing and enough solid detail to hold the imagination," *New York Times*; "should serve TV producers well as a model of how to combine information with entertainment," *Time Magazine*; "Disney's prize effort of the season; this whole series done by Disney on outer space travel has been a shining example of the versatile use of fact and fancy to make a show both amusing and informative—and a little controversial," *San Mateo Times*.

There were several reasons for the success of the three space shows. First, Walt Disney had insisted that they be factual, with the humor taking a back seat—"First get the material straight, then find the way you can tell it in an entertaining fashion." Second, no



This cartoon was roughed out by Ward Kimball and finished by John Dunn. It was sent to von Braun at the time of the launching of Explorer I.

Art: © 1958 Walt Disney Productions

CREDITS

MAN IN SPACE
Produced and directed by Werd Kimball. Written by Ward Kimball, Williem Bosche. Music: George Bruns. Layout design: A. Kendall O'Connor, Donald Griffith, Jacques Rupp. Animation: Julius Svendsen, Arthur Stevens, Jack Boyd, John Sibley, Eric Cleworth, Harvey Toombs, John Dunn. Backgrounds: Claude Coats, Donald Peters, Anthony Rizzo, George de Lado, Art Riley. Scientific advisors: Willy Ley, Dr. Heinz Haber, Dr. Wernher von Braun. Director of photography: William Skall, A.S.C. Film editor: Archie Dattlebaum. Nerration: Dick Tufeld. Special processes: Ub Iwerks. Sound: C.O. Slyfield. Acknowledgements: U.S. Department of Defense: Army, Navy, Air Force.

MAN AND THE MOON
Produced and directed by Ward Kimball. Written by William Bosche, John Dunn, Ward Kimball. Music: George Bruns. Layout design: A. Kendall O'Connor, Frank Armitage. Cartoon enimation: Julius Svendsen, Arthur Stevens, Joe Hale, Jeck Boyd, Charles Downs, Conrad Pederson. Space paintings: Al Dempster, William Layne. Technical advisor: Dr. Wernher von Braun. Rocket ship crew: Frank Gerstle, Richard Emory, Frank Connor, Leo Needham. Production supervision: Harry Tytle. Photography: Edward Colman, A.S.C., Charles Boyle, A.S.C. Art director: Marvin Aubrey Davis. Set decorator: Bertrem Granger. Assistant director: Robert H. Justman. Special processes: Ub Iwerks, Eustace Lycett. Special instruments: Mexwell Smith. Models: Wathel Rogers. Film editors: Lloyd Richardson, Sam Horta. Sound: Robert O. Cook. Acknowledgements: Griffith Observatory, Douglas Aircraft Company, Inc., Bill Jack Scientific Instrument Company, Protection, Incorporated.

MARS AND BEYOND
Produced and directed by Ward Kimball. Story by William Bosche, John Dunn, Charles Downs, Con Pederson, Ward Kimball. Music: George Bruns. Layout design: A. Kendall O'Connor, John Brandt, Tom Yakutis. Cartoon enimetion: Julius Svendsen, Arthur Stevens, Jack Boyd, Charles Downs, John Dunn. Space paintings: William Layne, Gordon Legg. Technical advisors: Dr. Ernst Stuhlinger, Dr. Wernher von Braun, Dr. E.C. Slipher. Models: Welthel Rogers. Film editors: Lloyd Richardson, A.C.E., Lionel A. Ephraim. Narration: Paul Frees. Special processes: Eustace Lycett. Sound: Robert O. Cook. Production supervision: Harry Tytle. Acknowledgement: Lowell Observatory.

money was spared to make the shows as good as they could possibly be. Costs ranged from a low of $250,000 (for the second show) to a high of $450,000 (for the third one), with a total of $1,000,000; as a comparison the three Davy Crockett shows the first season cost in the neighborhood of $800,000. Third, time was not a factor. According to Bosche, "Walt afforded us the luxury of time to really develop these things, to work with von Braun and go as far as we could. There was nothing in them that we didn't develop further because we didn't have the time. We took it as far as we could take it." Fourth, Ward Kimball and his crew were given free rein. Kimball recalls:

> The crazy thing about these shows was that we had relatively little input from Walt. Because he was so busy with Disneyland, we got away with things I am sure that if he had been riding herd on it as much as some of the other projects that came before or after, we probably wouldn't have been able to get some of those things in the pictures. There were things you couldn't explain to Walt. There were things that he saw later that he just thought were wonderful, but we all agreed that had we put them on a storyboard and tried to sell them, he'd have kicked them out. But once they were done he could see it. There were a lot of things in those shows that you couldn't explain with a storyboard treatment, and so we were fortunte in that respect. Even though he okayed the final story treatments, he went with our judgment for the details.

Kimball recalls when they first ran "Mars and Beyond" for the Disney staff in the Studio theater, "Walt was there; he sat in the back row. I sat next to him and when that cartoon section started coming on—the life on other planets—the whole theater was laughing. He turned to me and said, 'How do you guys think up all that crazy stuff?' That was a great compliment." Walt Disney's statement underlines a final reason for the success of the shows, and that was that Ward Kimball was the director and that he had put together an especially qualified group of men to work with him. Bosche affirms, "Ward was one of our real talents around here; in some ways he worked like Walt did. He would delegate things but he was always the director. He knew what he wanted but he let you develop it. He could see when it was working and when it wasn't." The combination of these five reasons spelled success.

It is interesting to note how closely the Disney space shows predicted events of the next few years. Of course, there were differences in the hardware, but the principles and the calculations turned out to be correct. There weren't any big surprises. If anything, the predictions of von Braun, Ley, Haber, Stuhlinger, and Slipher were too conservative. In visualizing the need for trips to the moon and Mars to begin from a space station, they had not imagined rockets the size of the Saturn 1B or the Saturn 5. It turned out that Dr. Haber had been more concerned about the problems of weightlessness, cosmic rays, and other physiological hazards than he needed to be. The timing was also a bit too conservative; no one guessed in 1955 that man would be walking on the moon a mere 14 years from the date of the first Disney space show. The Disney space station was certainly a forerunner of 1973's Skylab,and von Braun's winged fourth stage certainly brings comparisons with today's Space Shuttle.

The Disney space shows had been monumental efforts and they were greeted with enthusiasm throughout the world. Perhaps they did do their small part in speeding up the American space program. At least, Wernher von Braun never forgot the boost they had given his efforts. On the day that Apollo 8 first circled the moon, he placed a telephone call to Ward Kimball, saying, "Well, Wahd, it looks like they're following our script."

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